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Asheville Field Office

Report #82-1-31
July 1982

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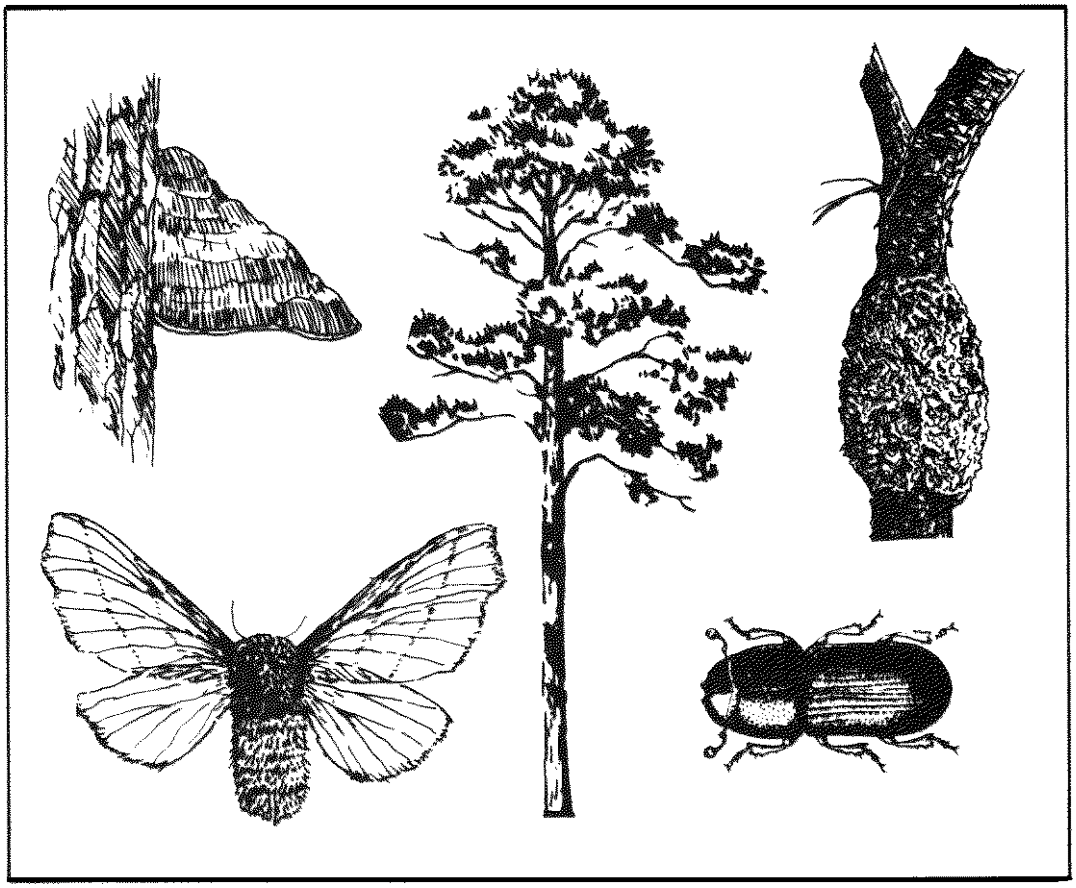
TREATED TWO YEARS WITH PYDRIN OR GUTHION
WEYERHAEUSER SEED ORCHARD, WASHINGTON, NC 1982



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AN EVALUATION OF CONELET POPULATIONS ON TREES TREATED TWO YEARS WITH PYDRIN[1/] OR GUTHION[2/] WEYERHAEUSER SEED ORCHARD, WASHINGTON, NC 1982

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1/ Pydrin = fenvalerate.

2/ Guthion = azinphosmethyl.

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ABSTRACT

Pines treated in 1980 and 1981 with Pydrin were heavily infested with scale insects during July 1982 and contained fewer conelets than trees treated with Guthion. This scale-Pydrin interaction threatens the usefulness of Pydrin in pine seed orchards and endangers the annual multi-million dollar harvest of superior seed. Recommendations for scale control, further evaluations, and research are included.

INTRODUCTION

Forest Service Research (SEFES) and USDA Forest Service, Forest Pest Management (FPM) entomologists were active from 1978 to 1981, testing and evaluating Pydrin, Imidan, and Ambush for control of seed and cone insects. In these early tests, control results with Pydrin looked especially promising. Beginning in 1980, FPM initiated a pilot project in both Louisiana and North Carolina to evaluate Pydrin and Guthion when applied via aircraft.

Preliminary results of this work were most satisfactory. Both Pydrin and Guthion are now registered for aerial use in southern pine seed orchards. Because of the safety benefit of using Pydrin, as compared to Guthion, many orchards have chosen to use this product during the 1982 spraying season.

During the 1980-1981 pilot project, observers noted a buildup of several species of scale insects on trees treated with Pydrin. The Pydrin treated trees were heavily infested by 1981 and covered with sooty mold, which grows on the honeydew produced by the scale insects.

This evaluation was made to determine the number of flowers produced and present on untreated trees and trees treated with Pydrin and Guthion for two years. Conelet counts were made during July 1982.

Orchard Information

Species: Loblolly, coastal long fiber - all treatment areas.

Establishment date: Pydrin - Guthion areas - 1963-1967.
Untreated area - 1963-1967.

Tree height: Pydrin - Guthion areas - 40-45.
Untreated area - 45-50.

Fertilizer: All areas treated the same - 300 lbs. N/ac.

Herbicide: All areas treated the same - Roundup band treatment.

Insecticide:

	1980	1981	1982
Pydrin area	Pydrin 1/	Pydrin 1/	Furadan 3/ Guthion 5/ Orthene 6/
Guthion area	Guthion 2/	Guthion 2/	Furadan 3/ Guthion 5/ Orthene 6/
Untreated area	None	None	Guthion 4/, 5/ Orthene 6/

METHODS

There were three treatment areas containing Pydrin-treated, Guthion-treated, and untreated trees. Conelet counts were restricted to one-half of each tree crown. In this half of each tree, all of the conelets were counted. In each tree, the area sampled was the same (Figure 1). We used 6 clones, 2 ramets of each clone per treatment, for a total of 34 trees. The areas sampled were heavily rogued this summer (1982), and in two cases, only one ramet per clone was available per treatment area.

1/ Pydrin applied at .75 lbs. AI/AC - 6 applications per year.

2/ Guthion applied at 3 lbs. AI/AC - 6 applications per year.

3/ Furadan applied at 2 oz/in d.b.h. in early March for scales.

4/ Guthion applied at 3 lbs. AI/AC - 1 application in April.

5/ Guthion applied at 3 lbs. AI/AC - 1 application in May and June.

6/ Orthene applied at 1 lb. AI/AC - 1 application in June for scale crawlers. Orthene = Acephate.

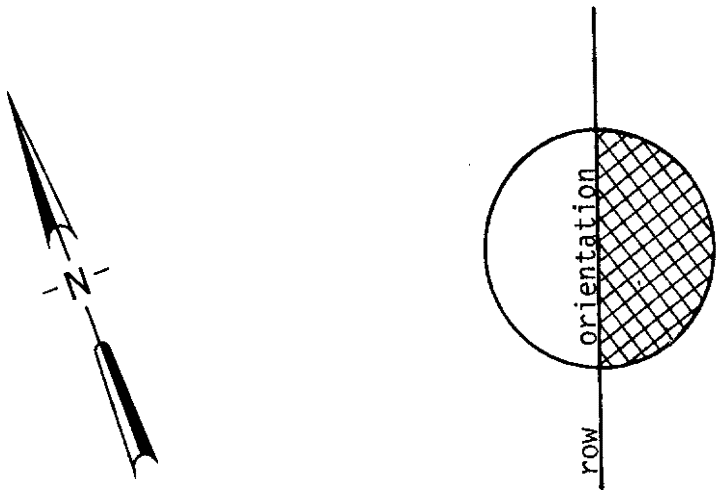

Figure 1.--Cross-hatched area = crown area sampled.

RESULTS

A July 1982 inventory, when subjected to a two-way analysis of variance, revealed significantly fewer conelets present on the eastern half of trees in the Pydrin-treated area (11.5) than in the Guthion-treated area (64.6) (Table 1). However, when the trees in the untreated area are also included in the analysis, Pydrin area conelet counts are not significantly different from Guthion area counts. The Pydrin conelet counts (11.5) are, however, different from the untreated area (148.5). In the three treatment analyses, the Guthion and untreated areas are not statistically different at the 5 percent level (64.6 vs 148.5).

All sample trees in the Pydrin area were infested with the woolly pine scale, Pseudophilippia quaintancii Cockerell (see cover photo); pine needle scale, Phenacapsis pinifoliae (Fitch); pine tortoise scale, Toumeyella numismatica (P. & McD.); and another unknown scale species. These trees were also covered with sooty mold. Trees in the Guthion and untreated areas were nearly free of scale problems and sooty mold.

DISCUSSION

Sucking insects; i.e., aphids, scales, mealybugs, etc., have in the past been thought to be innocuous seed orchard pests. While they may occur in great numbers, they did not appear to do any meaningful, measureable damage; i.e., twig, branch, or tree mortality.

Table 1.--1982 conelet populations on trees treated with Guthion and Pydrin for two years, 1980-81.

Treatment	Average number of conelets[1/]	
	3-way analysis of variance	
Pydrin	11.5	a[2/]
Guthion	64.6	ab
Untreated	148.5	b
	2-way analysis of variance	
Pydrin	11.5	a[2/]
Guthion	64.6	b

1/ Conelet counts were made on the same half of each tree crown.

2/ Treatment means followed by different letters are significantly different at the 5 percent level.

Since the first observation of the pine woolly scale outbreak in the Pydrin area during 1980, entomologists have been looking for potential damage. This evaluation points to the serious consequences of using Pydrin, a synthetic pyrethroid, and of allowing an outbreak of scale insects to increase unchecked.

Conelet production comparisons between the two treated blocks and the untreated area must take into account size and age differences. Since untreated trees are somewhat taller, have larger crowns, and are slightly older (most being planted in 1963, 1964), they may produce more conelets. Therefore, the only valid comparison may be between the Pydrin- and Guthion-treated trees. In this case, the Pydrin-treated trees had significantly less conelets present in July than did identical clones in the Guthion-treated area. In the flower producing year (1982), these trees were treated identically. The only difference between the treated blocks was a history of severe scale and sooty mold in the Pydrin area only and the chemical treatments themselves.

This potential threat to future improved seed orchard crops, which are valued in millions of dollars, is serious. Immediate action must be undertaken to determine the cause of this lack of conelet production and to determine ways of using Pydrin while eliminating scales as a potential threat to future seed crops.

RECOMMENDATIONS

1. Orchards using Pydrin in 1982 should be alert and watching for increases in scale populations. Report scale populations to either Larry Barber or Julie Weatherby[1/] at once.

2. If scale populations or sooty mold should build up on orchard trees, control measures should be taken in 1983. Control of scale insects could be obtained by applying Furadan 10G at the rate of 4 oz/in d.b.h. in January.

3. A southwide survey should be conducted this fall on all orchards using Pydrin to determine the scope of the scale problem. This would document which orchards using Pydrin have scale populations, and the amount of sooty mold present in infested areas.

4. Field tests should be established during 1983 to determine cost effective methods to control scale pests. These tests might be with insecticides such as Cygon or Orthene, both of which are systemic in nature. Other treatments, such as dormant oils or soaps, might be tried.

5. Evaluations should be undertaken to determine if Pydrin applications can be timed to minimize scale problems. These evaluations might look at alternating Pydrin and Guthion applications or some combination of Pydrin and Guthion to exploit the scale's life cycle.

1/ Entomologist, USDA Forest Service, S&PF, FPM, Alexandria, La.

6. An evaluation should be made to determine the minimum application rate of Furadan for scale pests control. This rate is probably less than 4 oz/in d.b.h., as recommended in 2. above.

7. Research should be implemented to determine the cause of the reduced conelet population in the Pydrin treated area. Is the cause the Pydrin itself, the sooty mold, or the scale insects?

8. Research should be undertaken to determine what causes the "bloom" of scale insects when Pydrin is applied. Are we killing predators, parasites, or influencing populations in some other way?